Henry Skinner

SUBSCRIPTION PRICE $3.00

OCTOBER, 1925

ENTOMOLOGICAL NEWS

Vol. XXXVI No. 8

COLEMAN T. ROBINSON
1838-1872

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PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES.
Logan Square

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1103.
Act of October 3, 1917, authorized January 15, 1921.

ENTOMOLOGICAL NEWS.
ACAD. NAT. SCI.
PHILADELPHIA, PENN'A.

ENTOMOLOGICAL NEWS.

published monthly, **excepting August and September**, by The American Entomological Society.

The subscription price per year of ten (10) numbers is as follows:

United States and possessions	**$3.00**
Canada, Central and South America	**3.15**
Foreign	**3.25**

Single copies 35 cents

ADVERTISING RATES: Full width of page. Payments in advance.

One issue, 1 in.,	$ 1.20,	2 in.,	$ 2.40,	half page,	$ 4.00,	full page,,	$ 8.00
Five issues, "	5.50, "		11.00, "		17.50, "		35.00
Ten issues "	11.00, "		20.00, "		35.00, "		70.00

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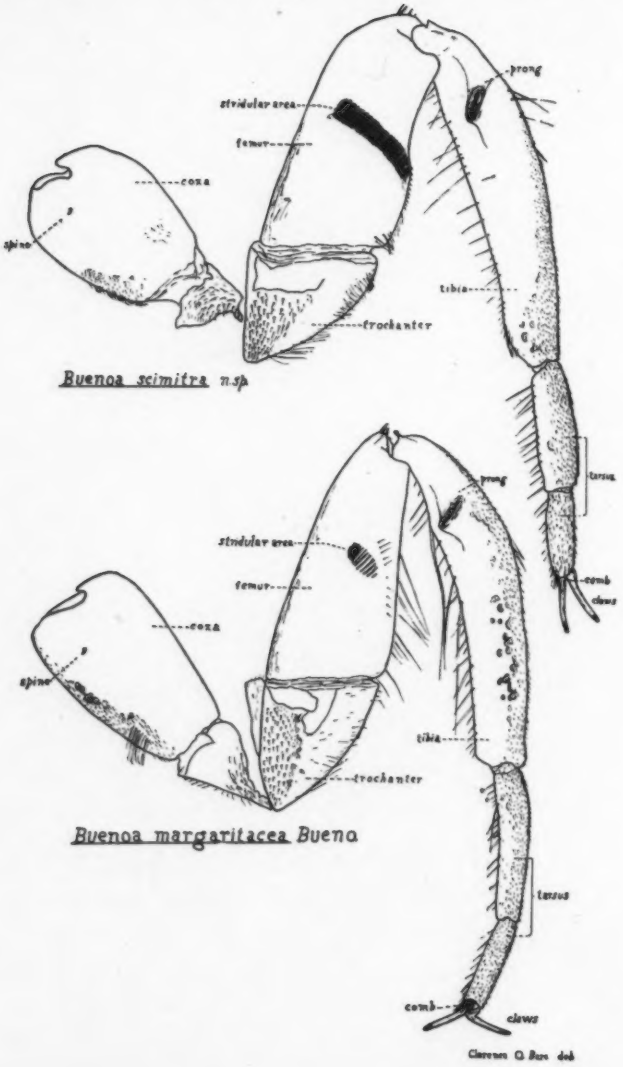

FRONT LEGS OF BUENOA SPECIES (NOTONECTIDAE, HEMIPTERA).—BARE.

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A New Species of Buenoa (Hemiptera, Notonectidae).

By CLARENCE O. BARE, Dept. of Entomology, University of Kansas, Lawrence, Kansas.

(Plate VI.)

In the year 1923-24 the author collected many backswimmers in the ponds about Lawrence and other places in Kansas. This collecting was preparatory to a thesis concerning the oxyhaemoglobin cells and to other studies of the genus *Buenoa* of the *Notonectidae*. At that time authors credited Kansas with but two species of *Buenoa, B. elegans* (Fieber) and *B. margaritacea* Bueno. The specimens collected, and especially those taken near Lawrence during the autumn and winter of 1924-25, showed the predominance then of a new species herewith described.

The collections show it to have been in Kansas since 1922 and to extend at least from Lawrence to as far south as Colorado County, Texas. It is very similar in general appearance, size and habits to *B. margaritacea* for which it has been mistaken. It is slightly smaller and the males are especially distinct from the latter because of the great difference in the stridular area on the inner faces of the front femora. The shape of the stridular area in the new species resembles very much that of an old-fashioned Turkish sword.

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Dr. Hungerford some time ago noted that there seemed to be two sizes of what was called *B. margaritacea* Bueno and studies have verified his observation. Bueno in 1909 wrote (Jr. N. Y. Ent. Soc., XVII, p. 77) that, "In the south and west there are a number of forms very close to *B. margaritacea* . . . ." Hungerford (Ent. News, XXVIII, Pl. XIII, figs. 5-6, p. 182) figures the stridular area on the front femur of *B. margaritacea* Bueno. The figures submitted herewith of the front legs of *B. margaritacea* and of this new species should aid in its identification.

Buenoa scimitra species new.

Size: Length 6.5 to 7.5 mm., width 1.75 to 2.25 mm. Females somewhat larger than the males.

Color: Notocephalon light; eyes brown or dark; anterior parts of scutellum, dorso-lateral parts of metathorax, and dorsal parts of abdomen all black or fuscous; elytra and posterior parts of pronotum pearly or hyaline; caudo-lateral margins and dorsal part of scutellum orange or reddish yellow; anterior part of scutellum showing through posterior part of pronotum dark; remainder of dorsal and lateral parts of light or reddish yellow color; legs and undersides of body mostly light; fringes of setaceous hairs bordering ventral air channels, underside of abdomen, small areas near humeral angles of wings, tips of tarsal claws of front and middle legs, inner and outer faces of front femora and coxae respectively, labrum, and tip of beak all fuscous or black; caudal sternite and parts of pleurites of each abdominal segment yellowish; spiracular openings light; anterior part of median ventral carina light.

Shape: Dorsum considerably arched; width across eyes slightly less than that of pronotum; shape in general almost identical with that of *B. margaritacea* Bueno to which it seems very closely related.

Structural characters: Head and eyes large and nearly as wide as pronotum; notocephalon diverging from synthylipsis and then slightly converging toward vertex; notocephalon in male, from cephalic view, width at narrowest point ventrad from vertex about one-half that at widest point dorsad from vertex; in female not quite so narrow; tylus prominent and full.

Two rows of short spines along caudal margin of hind femur, about seventy spines in each row (hind legs extended laterally); femur about one-seventh longer than tibia; a num-

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ber of short combing spines at distal end and anterior surface of tibia; tibia about twice length of tarsus; tarsal segments subequal; tibia and tarsus fringed with swimming hairs.

In museum material sides of pronotum in males somewhat depressed leaving distinct lateral ridge on each side, otherwise slightly tricarinate; in females and live specimens pronotum scarcely impressed; anterior median angle of pronotum projecting cephalad and slightly raised to point near synthylipsis; caudal margin of pronotum sinuous; surface punctate.

Scutellum smooth and about one-seventh longer than pronotum; claval orifice less than one-third length of scutellum; elytral suture hirsute and about one-third longer than scutellum; elytra smooth and hyaline or pearly; wing veins pale.

In male, a slender black spine present on caudo-sinistral margin of seventh abdominal tergite, same as found in male only of all other *Buenoae* examined; abdominal sternites covered with minute microscopical setae except small clean area caudad of fourth abdominal spiracles; fourth sternite nearly divided by median anterior projection of the fifth; in males, a small, round, black, glandular mass encircling a minute opening at junction of pleural sclerites in groove beneath edge of wing, about laterad of hind coxa and beneath lateral edge of large sclerite over base of hind leg.

Labrum hirsute; in male, lateral prongs of beak with stridular area in juxtaposition with tibial prong when front leg is flexed; on front leg of male, a minute spine on outer lateral surface and near base of coxa in juxtaposition with a *long sword-shaped stridular area consisting of fine transverse ridges across inner lateral face of femur;* in male, front tibia angulate at base and somewhat flattened; female tibia not so angulate; tibial prong of male containing about twenty setaceous teeth; tibia about as long as trochanter and femur together, a little longer than tarsus and claws together; first tarsal segment about one-half as long again as second which is nearly one-half as long again as the digitate claws; whole front leg somewhat stouter than that of *B. margaritacea* Bueno; a minute comb on inner flexed surface at distal end of tarsus and near base of claws.

Middle legs rather slender; femur slightly longer than tibia; tibia subequal with tarsus and claws together; first tarsal segment about one-third longer than second; second tarsal segment twice as long as claws; claws one-half diameter of those of front legs in male, in female subequal; two minute combs consisting of five or six small setae set closely together on outer distal end of tibia.

Holotype: ♂, Union Pacific Railway pond, Douglas County, Kansas, Oct. 25, 1924.

Allotype: ♀, Smith's pond, Douglas County, Kansas, Nov. 19, 1924.

Paratypes: 10 specimens, Union Pacific Railway pond, Douglas County, Kansas, Oct. 25, 1924. 31 specimens, Smith's pond, Douglas County, Kansas, viz.: 21 on Oct. 25, 1924, 7 on Nov. 19, 1924, and 3 on May 20, 1923. 7 specimens Colorado County, Texas, May 19, 1922, taken by Mrs. Grace Wiley.

Holotype, allotype and some paratypes in University of Kansas collection; some paratypes in the private collections of Dr. H. B. Hungerford and the author.

The following key is proposed to include the species now found and described in the United States. It is probable *B. platycnemis* (Fieber) does not exist here.

A. Scutellum broad and as long or longer than the pronotum.
  B. Pronotum in the male with four depressions, appearing tricarinate.
    C. Head with eyes in male nearly as wide as pronotum, a little narrower in female; legs robust; length 7.5-9 mm. .....*B. carinata* (Champion).
    CC. Head with eyes somewhat flattened and distinctly narrower than pronotum in both sexes; legs slender; pale color; length 6.5 mm.....*B. albida* (Champion).
  BB. Pronotum almost unimpressed, lateral carinae in some males.
    C. Small oval stridular area on front femur of males; length 6.7-8.1 mm. .....*B. margaritacea* Bueno.
    CC. Long sword-shaped stridular area across front femur of males; length, 6.5-7.5 mm. *B. scimitra* n. sp.
AA. Scutellum reduced and narrow and not as long as pronotum.
  B. Species over 6 mm. long.
    C. Pronotum of male large, inflated, and smooth; length 6.25-7 mm. .... *B. limnocastoris* Hungerford.
    CC. Pronotum of male tricarinate; large tibiae in front; length well over 6 mm. . *B. macrotibialis* Hungerford.
  BB. Species less than 6 mm. long .. *B. elegans* (Fieber).

Undescribed Species of Crane-Flies from the Eastern United States and Canada (Dipt.: Tipulidae). Part I.

(Continued from page 204.)

By CHARLES P. ALEXANDER, Amherst, Massachusetts.

Ormosia carolinensis sp.n.

♂. Length about 2.6 mm.; wing 4.2 — 4.4 mm.

Belongs to the *meigenii* group and is very closely related to *O. serridens* Alexander among the described species, differing in the details of structure of the male hypopygium.

Outer dististyle of male hypopygium heavily chitinized, arising from a broad paler base, beyond the short neck dilated into an oval body that bears an acute black spine at each end, the lateral spine about twice as long as the mesal spine which is situated on the caudal or outer face of the lobe just before the apex.

Habitat.—North Carolina. *Holotype:* ♂, Guilford College, Guilford County, March 18, 1918 (*J. Speed Rogers*); Coll. No. 34. *Paratopotypes,* 2 ♂♂.

Molophilus (Dasymolophilus) niphadias sp.n.

♂. Length about 1.6 mm.; wing 2.2 mm.

Related to *M. (D.) ursinus* (Osten Sacken), from which it is told by the very small size and pale coloration. The head is brownish testaceous. Mesonotal praescutum reddish, the lateral margins and pleura obscure yellow. Wings indistinctly dimidiate, the basal half whitish subhyaline, the cells beyond the cord distinctly infumed; veins a little paler. Anal angle of wing lacking. Venation; *r* and the perpendicular basal deflection of R_{2+3} in transverse alignment and lying a little proximad of the basal deflection of R_4 and *r-m*, which are likewise in alignment; cell M_3 very deep, its fork approximately opposite *r-m*, the petiole thus being very short; cell *2nd A* very narrow. Abdomen yellowish testaceous, the terminal segments and hypopygium more brownish black.

Habitat.—Michigan. *Holotype:* ♂, Cascade Glen, Ann Arbor, Washtenaw County, June 24, 1920 (*J. Speed Rogers*); Coll. No. 10. *Paratopotypes,* 4 ♂♂.

M. (D.) pusillus Edwards (Scotland) is a larger species though similar to *M. niphadias* in the pale coloration. The subgenus *Dasymolophilus* Goetghebuer includes besides its type,

M. murinus (Meigen), *M. niphadias, M. pusillus* and *M. ursinus* (Osten Sacken), the second and last named being Nearctic species.

Molophilus (Molophilus) floridensis sp.n.

General coloration dark brown, sparsely pruinose, the anterior margin of the praescutum yellowish; antennae of male elongate; wings tinged with brown; basal section of M_3 longer than *r-m;* male hypopygium with two apical dististyles, each appearing as a flattened blade terminating in an acute beak.

♂. Length about 2.6 mm.; wing 3.4 — 3.5 mm. ♀. Length about 3.8 mm.; wing 4 mm.

Rostrum and palpi dark brown. Antennae of male elongate, if bent backward extending to some distance beyond the base of the abdomen, dark brown throughout. Head dark brown, the vertex largely blue-gray pruinose.

Pronotum yellowish brown. Mesonotum and pleura dark brown, more or less pruinose, the antero-lateral margins of praescutum light yellow. Halteres pale, the knobs a little infuscated.

Legs with the coxae and trochanters yellowish testaceous; remainder of legs black, the femoral bases narrowly obscure yellow. Wings with a brown tinge, the base and costal region somewhat more yellowish; veins slightly darker brown. Venation: Basal deflection of M_{3+4} longer than *r-m;* vein *2nd A* long and nearly straight, ending about opposite the fork of *Cu.*

Abdomen brownish black, the hypopygium a little brighter. Hypopygium with the basistyles elongate, on the mesal face with a fleshy lobe set with about 15 stout black spines and additional setae; a long flattened basal dististyle lying in a groove on the face of the basistyles; two apical dististyles of approximately similar shape, being flattened, with the apical angle produced into a slender acute beak, the inner of these styli larger and with a longer beak, the outer style covered with microscopic appressed setae, the inner style nearly glabrous, with but a few scattered setae.

Habitat.—Florida. *Holotype:* ♂, Gainesville, Alachua County, February 28, 1922 (*J. Speed Rogers*); Coll. No. 17. *Allotopotype,* ♀, March 8, 1924. *Paratopotypes,* 28 ♂♀, with the allotype.

This fly bears a superficial resemblance to *M. nova-caesariensis* Alexander but is a very different species, being much more closely allied to members of the *pubipennis* group.

Note on the Poison Apparatus of Lagoa crispata Pack. (Lepid.: Megalopygidae).

By PAUL M. GILMER, New Mexico College of Agriculture.

A very interesting article appeared in the December (1924) number of the *Annals of the Entomological Society of America* on the poison apparatus of *Lagoa crispata* Pack. This paper is by Dr. Baerg of Arkansas University, who has made especial study of poisonous Arthropods.

It so happens that the same form came under my own observation some months ago in the preparation of my paper, now published, on the structure of poison apparatus of Lepidopterous larvae. Since my work was primarily a comparative study I naturally had at hand material and data which previous workers on the *Megalopygidae* could not have had access to. As a result a number of the apparent anomalies of structure in these forms is explainable upon a basis which does no violation to the generally accepted ideas of insect morphology.

The previous works of Packard, 1894, von Ihering, 1911, and Foote, 1922, all agree in that their authors were convinced that the poison secreting cell was the gland-like cell found beneath the spines in the hypodermal layer. Dr. Baerg, however, and also myself have both noted that these gland-like cells appear not only beneath the toxic spines, but also beneath the non-toxic elements such as plume hairs, etc. Since this is the case it seems highly improbable that these cells can constitute the poison-secreting apparatus, and Baerg, in his paper, remarks upon this fact. My own work has shown me that these cells differ very considerably from the usual type of poison cell structure, in that they lack the very heavy infiltration with granules, which take nuclear stains so heavily.

A careful examination of a series of sections through the tubercles bearing the spines show a number of notable facts. First the cuticula is very heavy, of a thickness not often reached in insect body wall. The poison spines are perched on top of this thick cuticula, with the so-called 'theca' about two-thirds buried in the secondary cuticula, but coming far short of reaching the hypodermal level. The 'theca' is com-

posed of a thin cellular sac which is continuous with the flattened hypodermal lining of the spine proper. At first glance these cells seem completely isolated from the body wall hypodermis proper, an indeed anomalous type of structure in insects! A more careful examination under high dry lens will show a number of peculiar striae running obliquely across the usual 'grain' of the cuticula, that is in the general direction away from the hypodermis and toward the primary cuticula. These striae seem to end at the bulbous cavity containing the 'theca,' while exactly similar striae also pass up to the small subtriangular pockets containing the trichogen cells of the plumose hairs, which lie at the same level as the 'thecae.' Finally scattered along the line of these striae will be noted small isolated cells, which, upon careful examination, appear to consist almost wholly of nuclear material.

Let us examine the meaning of these facts. The small isolated cells constitute the nuclear portions of the much drawn out hypodermal cells which fill the very narrow pore canal between the 'theca' and the hypodermis proper. The striae are simply these pore canals containing very much drawn out cytoplasmic matter in direct connection with these pocketed nuclei. In fact these threads are double, as would be expected and the presence of two nuclei in a single pocket is not uncommon.

The 'theca,' then, is simply a continuation of the hypodermal layer, and is in direct communication with it through the drawn out cells occupying the pore canals. This is exactly in accord with the structures demonstrated for other forms, and is the interpretation given the structures by von Ihering. The 'theca' and spine hypodermis is merely an evagination of ordinary body wall hypodermis, and the 'theca' itself becomes merely an enlarged cavity in the pore canal.

The question at once arises why this enlargement appears. Heretofore all workers have considered it merely a storage sac for the poison. Baerg also is inclined to this position. There are two objections to it. First, except for the possible secretion of small amounts by such forms as *Euproctis chrysorrhea* Linn.

and a few of its close relatives, we have no well authenticated case of actual secretion of the poisonous element as such, the cytoplasm serving always as the carrying agent. By analogy then it is doubtful that it is secreted in *Lagoa*. The second is the question of the origin of so large a quantity of poison. The theca cells are not gland cells, the gland-like cells beneath are common to both venomous and nonvenomous structures and lack the characteristics common to all poison gland cells in other Lepidopterous larvae. If these cells are not the poison cells, and Baerg is convinced they are not, whence is its origin?

This is the point where Baerg, as have all other workers so far, has failed in his observations. Comparative material, such as was at my hand in plenty, first gave the hint. The granular mass contained in the 'theca' is not secreted poison. It is the gland cell itself. The granules are so plentiful and take the nuclear strains so heavily as to usually completely obscure the rather small much lobate nucleus. Among some two or three hundred preparations of Megalopygids I found only three preparations where the nucleus was at all visible. This will give some idea of the reason why former workers have overlooked it. Without the hint given by other forms it is probable that I should have missed it as completely as have Packard, von Ihering, Foote and Baerg.

With the above explanation the form at once drops into its appropriate niche in the series of forms showing the development of the poison spine from a primitive form possessing a poison seta only. In fact, the ancestral seta is still present as the penetrating tip of the spine. I am taking this opportunity of amending Dr. Baerg's paper while the matter is still fresh in the minds of entomologists interested in the structures involved. My own paper, which has appeared within a short time,* gives a more extended discussion of the forms together with plate and half tone cuts of the structures involved.

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Eight Months Study of Earwigs (Dermaptera).

By MILTON T. GOE, Portland, Oregon.

Early in the Spring of 1924 my wife and I resolved to get some live earwigs for the purpose of finding out by actual observation if the female does nestle on her eggs to hatch them. During this period of life study we learned many interesting things about this insect which we believe the public should know.

This article is written from notes taken from time to time and is as nearly correct as patience and vigilance can make possible. In our endeavor to get the real scientific facts we did not confine ourselves to the study of the insects in captivity, but made observations wherever these insects could be found.

On the sixteenth day of March we secured two males, which we placed in a wide-mouthed pint fruit jar containing about two inches of soil: for a cover we used a piece of thin muslin held in place by a rubber band.

In each jar we placed a small chip of wood for them to hide under. These containers were used during our whole course of experimental study.

These are the so-called "European Earwigs," *Forficula auricularia*. They are three-fourths of an inch in length and about one-eighth of an inch in breadth and of a brownish color. Although they have well developed wings we have never seen them fly. The males have strong curved forceps thickened at the base and notched on the inside. The forceps of the females are nearly straight, slender and unnotched.

The first thing we did after caging them was to try to find

their proper food. Believing them to be vegetable feeders we placed leaves of rose, violet, primrose, iris and wallflower in the jar. We had been told by a gardener that they ate holes in his most choice plants, but they did not feed upon any of these. Next we put in flowers of daffodil, wallflower and primrose. Upon careful examination we found they would not eat any of these flowers. Remembering that Dr. L. O. Howard in *The Insect Book*, editions of 1901-1910, said he believed them to be carnivorous, we supplied them with a piece of fresh raw beef which they soon found and immediately began eating. This was on the 23d day of March, and up to this time they had eaten nothing since being captured March 16th.

From this time on we fed them principally with fresh raw beef or pork, they seeming to have no choice between fat and lean. We found them fond of dead slugs, dead flies, dead grasshoppers and live aphids.

They are delicate feeders and live on small, soft-bodied, live insects and dead insects of any kind. In one instance we knew of their beginning to feed upon a grasshopper which was still alive and kicking.

Although they assume a threatening attitude when disturbed, they are very timid and noncombative. Later in the season we placed various kinds of fruits and flowers in with them and upon examination through a lens we could find no trace of their having been touched. Among the flowers with which we tempted them were roses, carnations, pinks, and sweetwilliams. They do eat molasses, as do many other carnivorous insects. We found that they like to crawl into the deep recesses of flowers of various kinds, which nearly always harbor tiny insects which make dainty food for them. They often remain in the dark, cool corolla of flowers sleeping during the hot summer days. When flowers are carried into the house, unless they are carefully shaken, earwigs may also be carried in with them. They are also carried into houses on wood, limbs of fruit trees and occasionally in fruit that is split.

They are not naturally a household pest like the cockroach, and when a reasonable amount of care is exercised not to carry

them into the house, dwellings will be unmolested by them. During March, April, May and the early part of June they may be found under loose stones, old boards, pieces of cloth, paper, in hollow stems of any kind, and around all kinds of rubbish.

In the latter part of June or early July they begin climbing trees, shrubs and flower stalks, as we believe, in search of aphids and other small insects which are quite plentiful in these places at this time of the year. During this period they may be found under loose bark of trees, cracks and crevices of old buildings as well as places mentioned before. Finding a nest of little black ants, we put some eggs and pupae in one jar and in two other jars eggs, pupae and a few ants. The next morning the eggs and pupae were gone in the jar where there were no ants but in the other two we found the ants had gathered the eggs and pupae into a heap and were nearby guarding them. We then removed the ants and the following day these eggs and pupae had also been eaten.

It was reported that earwigs ate holes in laundry while out on the line and that they destroyed carpets on floors. We placed pieces of cotton cloth and woolen cloth in jars with the earwigs and withheld their food for some time, and after we again began feeding them we left these pieces of cloth in the jars for weeks but neither the cotton nor the woolen cloth was molested. We even dampened the cotton cloth to make it more like laundry but we could not entice them to eat it.

March 26, we found two undeveloped males, and April 2, nine more males some developed and some not. Although we were looking for female earwigs every few days, the first we found was on the 10th day of April, when we found two that were not fully grown. These females were placed in separate jars each with a male.

The forceps of both male and female are opened wide and raised high and threateningly over their bodies when disturbed, but to the best of our knowledge, they are never used in combat. We endeavored to get them to close their forceps on some objects but were never successful.

In mating, the male backs up to the female and seizes her between his wide open forceps, ventral sides of male and female being opposed: the notched forceps of the male being used for claspers.

In pairing earwigs we often had to change them three or four times before finding two that were congenial. To win the admiration of the female, we saw one male walk over and around her, rub himself against her, stopping occasionally to preen himself.

Earwigs do not feign death when molested but scamper away. When awake they are easily disturbed and move very quickly. During the early morning hours they sleep so soundly as to appear dead.

They clean themselves frequently and during stormy weather enter the soil, remaining there until after the storm.

On May 3, we found 48 small, round, creamish white eggs. These were laid in a heap in the soil. These eggs were removed carefully to another jar and kept for nearly a month but none of them hatched, and from this we take it for granted that the presence of the female is necessary for the hatching of the eggs. No more eggs were laid by this female. Only one female laid a second batch of eggs and two laid no eggs at all. These two were adults when we got them and were probably mothers of some of the partially grown insects found at the time we found them, in early Spring.

About eight o'clock in the morning of May 6th we searched the jars for eggs, but no eggs were to be found; but later in the morning, about nine o'clock, while changing the soil we found that female number 2 had laid a batch of eggs under a small piece of pork. She made a nest about the length and breadth of her body by removing particles of dirt with her mouth. She, then, placed the eggs in one by one laying them evenly on the soil. After getting the eggs all in the nest she began to arrange them. She would take out one egg, sometimes two, lay aside, remove some soil and then replace them. For four hours we watched her, as she slowly and carefully worked her eggs down into the soil. About eight o'clock that

evening she had them at the bottom of the soil in the jar and was sitting on them, as at this time she could be seen through the jar. The following morning there was still a small opening where she went down but she could not be seen. When the eggs were first laid she chased the male away, but later allowed him to come near.

The females, during the period of incubation, which is from 15 to 18 days, and for several days after the eggs are hatched, seldom come to the surface, but remain in the soil with their brood. The males seldom enter the soil during this period, but are more often seen directly over the nest than elsewhere. This, we believe, accounts for the appearance of the males in early Spring before any females are to be seen.

The young were so small and so active that we could not change the soil nor count them. We found that they did better in soil that was only slightly moist. The young are almost white just after moulting.

It was impossible for us to record the times they moulted, but it requires about five months for them to mature.

In Portland, we have two natural enemies of the earwig in the insect world: the genus *Omus*, of the Cicindelidae, which is nocturnal, and some species of Staphylinidae. The habits of these insects are nearly the same as that of the earwig. We placed earwigs in jars with these insects and in each case they were devoured. It is no easy matter for the rove beetle to capture his prey in the open as the earwig is about as quick as the rove beetle. We watched the unsuccessful attempts of one of the roves to capture an earwig for about thirty minutes; then he made a tunnel into which the earwig crawled and was quickly captured and devoured. It seems to us, that the tunnel was made for a trap, but whether it was or not is a question.

We know nothing definite of the life history of the earwig during December, January and February, but believe they lay and hatch a brood during this period. We killed the earwigs we had in captivity on the 23d day of November. At this time they had good appetites and were as active as at any time.

The "Sun-ray" Structure in the Posterior Larval Spiracles of Some Muscoid Flies (Diptera).

By CLAY G. HUFF, Department of Medical Zoology, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland

In this paper, will be presented the results of observations, together with certain inferences which may be drawn, upon the very fine and delicate chitinous rays found in fairly constant positions on the posterior larval spiracles of some of the common Muscoid flies such as *Phormia regina, Calliphora erythrocephala* and *Lucilia sericata.* In the spiracles of most species, these rays are easily overlooked; for they are on a slightly higher plane than the more conspicuous, darker parts of the spiracle, and are quite transparent. However, by using high magnification and continuously manipulating the fine adjustment of the microscope, the author has found them on the spiracles of species in which he had repeatedly overlooked them previously. Perhaps, the most striking characteristic of these rays is the fact that they are never parallel; but on the contrary, they either radiate from a common center or diverge from a convex line upon which they have their origins. The cases in which they radiate from a common "focus" are, by far, the commoner. The "foci" or centers from which they radiate are fairly conspicuous and are often visible in preparations in which it is impossible to see a trace of any of the rays. These "foci" are four in number in all of the cases which have been examined by the author. Their positions in reference to the ring are variable with the different species. In *Morellia micans,* and *Stomoxys calcitrans,* they appear as small slit-like or ellipsoid openings in the opaque ring; while in *Muscina stabulans, Calliphora erythrocephala, Phormia regina* and *Lucilia sericata,* for example they occur within the ring, usually near the slits.

Since *Calliphora erythrocephala* is fairly typical of this second group, the rays will be described as they occur in it, in more detail. (Fig. 1). Beginning on the inner side of the spiracular plate, the groups will be numbered consecutively.

The first, third, and fourth have their "foci" in the edge of the inner, middle and outer slits, respectively; the first being on the inner edge of the inner slit, while the third and fourth are on the outer edges of the middle and outer slits. The "focus" of the second set of rays is at the outer edge of an ellipsoid, chitinized body between the inner and middle slits. The areas from which the rays arise are clear; but they are

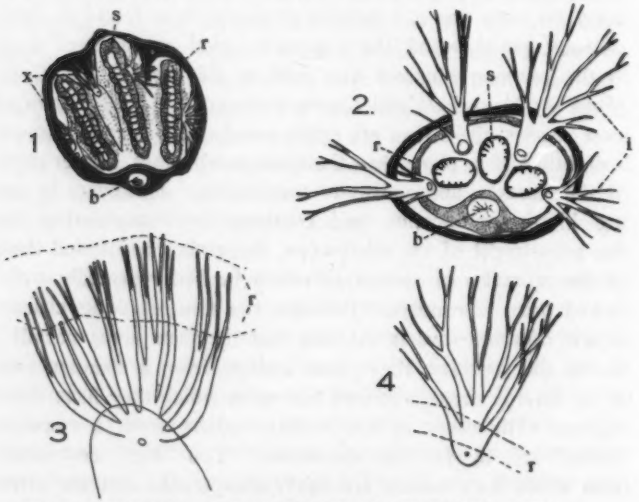

Figure 1.—Posterior larval spiracle of *Calliphora erythrocephala*. (x98.)
Figure 2.—Posterior larval spiracle of *Drosophila hydei*. (x438.)
Figure 3.—Second "sun-ray" structure of *Phormia regina*. (x438.)
Figure 4.—Second interspiracular bristle of *Drosophila hydei*. (x438.)
b.—button; i.—interspiracular bristles; r.—ring; s.—slit; x.—"sun-ray" structure.

encircled or partially encircled by a chitinous ring, a part of which is formed, in the first, third, and fourth, by the edge of the slits. The rays are generally three to six in number at each "focus" and are branched, usually dichotomously. They are much alike in most of the species which have been examined in this study. In some, however, because of the opaque condition of the underlying structures, only the "foci" and the tips of the branches which extend beyond the ring may be seen.

Froggatt (1918) has described these rays under the name of the *"sun-ray"* effect, as follows:

"The rounded end (of the intermediate structure) incloses a clear space, the margin of which shows under a low magnification, a 'sun-ray' effect. This is due to fine bands of chitin radiating outwardly to the band. The inner ends of these chitinous bands project over the rim of the clear space and would seem to support some soft structure in life, which is destroyed in the preparation. In most species, also, a space resembling a blister occurs on the side of the slits. This 'blister-structure' also shows the 'sun-ray' effect referred to in the 'intermediate structure.'"

Evidently, the "blister-structure" of his description is the portion of the edge of the slit which is mentioned in this paper as constituting part of the "focus." In the literature upon larval spiracles known to the author, there is no reference to be found other than that of Froggatt, to these rays which have just been described. However, Dr. F. M. Root has often noted them in working with posterior larval spiracles and he was responsible for directing the author's attention to their study. He has very kindly loaned material from his collection of spiracles to aid in this study.

Examinations of these rays in various species have often shown them folded back over the "foci," and in some cases they have been visible for considerable distances outside of the ring. This fact indicates that these rays do not, as Froggatt thought, "support some soft structure in life."

This belief is further strengthened by certain homologies which exist between these "sun-ray" structures and structures occurring in corresponding positions in the spiracles of other groups. Metcalf (1913) refers to structures in the Syrphidae occurring between the spiracles as *interspiracular bristles, spines, or ridges.* In his first report on the Syrphidae of Maine, this same author (1916) mentions interspiracular ornamentations of the species, *Pepiza pisticoides, Tropidia quadrata,* and *Syritta pipiens* among the Syrphidae, as having distinctly a bristle-like form. Particularly striking are his figures of the last two of the above named species. It seems

that the homologies existing between the interspiracular bristles of these species and the "sun-ray" structures which have been described above must have some significance.

That these "sun-ray" structures are probably homologous to bristles is still more strongly indicated by a comparison of them with similar structures on the spiracles of certain species of the genus *Drosophila* examined by the author. The larval spiracles of this genus, as is well known, are situated on long, raised processes. They resemble the larval spiracles of other Muscoid flies in that they have a distinct ring with a button and three slits with rudiments of anastomosing bars. *But most significant is the fact that, from positions corresponding to those of the "sun-ray" structures in other larvae, there arise four long bristles.* (Fig. 2.). Sturtevant (1921) says, in speaking of these bristles:

"Each process ends in a chitinized tube that has at its tip three spiracular openings that are surrounded by very slender outwardly directed chitinous rays. When the larva is feeding it lies buried in the food, with only the tips of these spiracular processes exposed to the air. The rays around the openings evidently serve to prevent the openings themselves from sinking below the surface and thus cutting off the air-supply of the larva."

Figures 3 and 4 represent the second "sun-ray" structure of *Phormia regina* and the second "interspiracular" hair or bristle of *Drosophila hydei* respectively. In general, these two structures resemble each other (1) in having about the same position in the spiracle; (2) in having the "focus" of the former and the base of the latter very much alike; (3) in having approximately the same number of main branches; (4) in the nature of their branching; and (5) in the fact that the branched ends are free.

In investigating the function of the bristles of larval spiracles of *Drosophila*, the author has observed the larvae in liquid and semi-liquid media, both from the side and from above, under fairly high magnification While under the medium in which they are feeding, these larvae keep the long, interspiracular bristles closely folded back along the lateral surface of the

chitinized tubes; but as soon as the tubes are thrust above the surface of the liquid, these hairs are raised to a horizontal position and may be seen to lie along the surface of the liquid for their entire length. That the adhesion of the water to them is very slight, is shown by the distinct convex meniscus around each one; and their function is apparent to one as soon as he has seen them in this position.

From these observations, it seems very probable that the "sun-ray" structures in the larval spiracles of the Muscoid flies are homologous to the bristles found on the spiracles of various species of *Drosophila* and of some species of the family Syrphidae. Whether there is a corresponding *analogy* or not, the author has not ascertained; although the small size of the "sun-ray" structures would indicate that they do not, in the species which he has examined, serve the same function as the interspiracular bristles of the *Drosophila* larvae. If this homology be accepted, it is the belief of the author that the structures previously called "sun-rays" should henceforth be designated as *interspiracular bristles*. The "foci" which have been described in this paper and the "blister-structure" of Froggatt's description should then be nothing more than the somewhat modified bases of the interspiracular bristles.

The distribution of these bristles over the various groups of Muscoid larval spiracles, and the significance which they may have in the question of the interrelations of these groups are being subjected to further investigation.

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ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., OCTOBER, 1925.

Evolutionary Entomology.

One should not, perhaps, expect to find thoroughly accurate statements of entomological fact and theory in the "popular" magazines, although why their editors and publishers should not demand and require strict adherence to accuracy is an interesting question. We shall not, however, discuss it here. But when a journal like *The Atlantic Monthly* publishes a misleading entomological article, we feel justified in calling attention to it. "The article alluded to is in the July number and is entitled "The Bee's Knees," by Charles D. Stewart, with an epilogue in the issue for September (p. 430). We call it a misleading article, for the reader unacquainted with bees and their relatives will get from it the idea that there are no "progressive stages," no "stages of incompletion" leading up to the highly complicated organs possessed by the honey bee, such as the antenna-cleaner (Mr. Stewart's own example). Throughout his consideration of "Darwin's theory of evolution," which is the moral to Mr. Stewart's interesting account of the structure and functions of the bee's legs, there appears to be a total forgetfulness of the fact that there are Hymenoptera, of successively increasing complexity, leading up to the honey bee and that the explanation of Mr. Stewart's riddles, for which he seeks in vain, is to be found in a comparison of these different degrees of complexity.

It is to be hoped that some competent student of bees may be induced to treat the question more broadly than Mr. Stewart appears able to do, and that the editor of *The Atlantic* may give the readers of that magazine an opportunity to look at the "Mystery" of the bee—and of life in general—from the standpoint of one possessing wider information.

A Catalogue of the Coleoptera of Michigan.

Mr. A. W. Andrews of Detroit and the writer are working on *A Catalogue of the Coleoptera of Michigan*. They would appreciate it if persons having Michigan material of this order would submit a list of species and localities, or, if their material is undetermined, would favor them with the loan of the specimens for the purpose of determination. Proper credit will be given in every instance.—MELVILLE H. HATCH, Department of Zoology, University of Michigan, Ann Arbor, Michigan.

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Two Changes of Names (Heteroptera, Coleoptera).

In a recent letter from Dr. E. Bergroth, Ekenas, Finland, he states that my *Ischnodemus pusillus* (Entomological News, XXXVI, 1925, p. 45) is preoccupied by *I. pusillus* Dallas, a South-African species. I therefore propose in its stead the specific name *minutus*.

Mr. Chas. Schaeffer informs me that my name *Haltica aenescens* (Coleoptera of Indiana, p. 1202) is preoccupied by Weise for a variety of the European *H. lethri* Aub. I therefore change it to *H. aenëola*.

W. S. BLATCHLEY, Indianapolis, Indiana.

Dr. W. M. Mann, Superintendent.

Dr. William M. Mann, formerly entomologist in the Department of Agriculture, is now superintendent of the National Zoological Park, Washington, succeeding Dr. Alexander Wetmore.

Entomological Literature

COMPILED BY E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers in Heavy-Faced Type refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

Papers of systematic nature will be found in the paragraph beginning with (N). Those pertaining to Neotropical species only will be found in paragraphs beginning with (S). Those containing descriptions of new forms are preceded by an *.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

1—Trans., The American Entomological Society. **4**—Canadian Entomologist. **6**—Journal, New York Ent. Soc. **7**—Annals, Entomological Society of America.. **8**—The Entomologist's Monthly Magazine. **9**—The Entomologist.

10—Proc. Ent. Soc. Washington. **12**—Journal of Economic Ent. **13**—Journal of Entomology and Zoology, Claremont, Cal. **14**—Entomologische Zeit., Frankfurt a.M. **16**—The Lepidopterist. **18**—Internationale Ent. Zeit., Guben. **21**—The Entomologist's Record. **22**—Bulletin of Ent. Research. **25**—Bull., Soc. Ent. France. **33**—Bull. et Annal. Soc. Ent. Belgique. **39**—The Florida Entomologist. **45**—Zeit. f. Wissenschftl. Insekentb., Berlin. **49**—Ent. Mitteilungen, Berlin. **50**—Proc. U. S. National Mus. **54**—Boletin, Soc. Ent., Espana. **56**—Konowia, Wien. 59—Encyclopedie Ent., Paris. **67**—Bulletin, Soc. Ent. Egypte. **69**—Comptes Rendus des Seances, Acad. Sci. Paris. **75**—Annals and Mag. of Nat. History, London. **89**—Zool. Jahrbucher, Jena. 104—Zeit. f. Wissen. Zool., Leipzig. **107**—Biologisches Zentralblatt. **120**—Ann., Naturh. Mus., Wien. **123**—Bul., Mus. Comp. Zool. Cambridge, Mass. **124**—Revue Suisse de Zool., Geneve. **126**—Revista Chilena Hist. Nat. **130**—Ohio Jour. of Sciences. **133**—Jour. Experimental Zool. **137**—Archiv f Zoologi, Stockholm. **138**—Amer. Mus. Novitates, New York. 141—Amer. Naturalist. **154**—Zoolog. Anzeiger.

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(S) ***Laing, F.**—Descriptions of some n. g. and sps. of Coccidae.—**22,** xvi, 51-66.

LEPIDOPTERA.—Bolanos, A. G.—Como se cazan las mariposas con la lampara y la red?—Bol. Soc. Est Biol., Mexico, i; 8-10. **Bouvier, E. L.**—Contributions a la connaissance des metamorphoses chez les saturniens Hemileucides.—**59,** Lep., i, 3-10. **Coolidge, K. R.**—Life history of Danaus bernice strigosa.—**1,** lii, 27-33. **Ege, R.**—Respirationsforjoldene hos Hydrocampa nymphaeata (Jarve og puppe).—Vidensk. Med. Dansk. Naturh. For. Kobenh., lxxvi, 29-42. **Esaki, T.**—Uber die mimese der Kallimaarten.—**45,** xx, 110-13. **Gerould, J. H.**—Right-left gynandromorph of the alfalfa butterfly, Colias eurytheme var alba.—**133,** xlii, 263-92. **Gilmer, P. M.**—Comparative study of the poison apparatus of certain lepidopterous larvae.—**7,** xviii, 203-39. **Hasebroek, Dr.**—Prinzipielle loesung des problems des grossstadt- und industriemelanismus der schmetterlinge.—**18,** xix, 78-80. **Kuhn u. Ilse.**—Anlockung von tagfaltern durch pigmentfarben.—**107,** xlv, 144-9. **Molliard et Rabaud.**—Reaction des antennes de papillons aux temperatures elevees ou aux chocs.—Feuil. des Natural., Paris, 1924, 32-3. **Riley, N. D.**—Seasonal variation in butterflies.—Proc. So. Lond. Ent. & Nat. Hist. Soc., 1924-25, 67-81. **Savin, W. M.**—A remarkable partnership between the spanish bayonet and the yucca moth. . . . Nat. Hist. New York, xxv, 276-82. **Schepp, O.**—Nochmals zur praparation der falter u. s. w.—**18,** xix, 76-7. **Suffert, F.**—Geheime gesetzmassigkeiten in der zeichnung der schmetterlinge.—**124,** xxxii, 107-11. **Verity, R.**—Remarks on the evolution of the Zygaenae and an attempt to analyze and classify the variations of Z. lonicerae and others subsps.—**21,** xxxvii, 101-4 (cont.). **Wunschik, H.**—Erhohung der wirksamkeit der knollchenerreger unserer schmetterlingsblutler durch passieren der wirtspflanze.—Centralb. Bakt., Parasit. u. Infekt., Abt. 2, lxiv, 395-445.

(N) ***Barnes & Benjamin.**—Notes and new species.—**10,** xxvii, 123-9. ***Braun, A. F.**—Some undescribed microlepidoptera and notes on life histories.—**1,** lii, 13-17. New microlepid. from the southwest.—**4,** 147-50. ***Cassino & Swett.**—Some new Geometridae.— **16,** iv, 33-56. ***Holland and Schaus.**—Epipaschiinae of the western hemisphere; a

synonymic catalog of the sps. hitherto described, with figures of many, which have not heretofore been depicted.—An. Carnegie Mus., xvi, 49-130. ***Neustetter, H.**—Drei neue Heliconius formen.—**18,** xix, 60-1. ***Polaeck, E. R.**—New aberration of Junonia coenia.—Bul. Maryland Acad. Sci., iv, 10-11.

(S) ***Bouvier, E. L.**—Heliconisa bedoci sp.n.—**59,** Lep., i, 35-6. ***le Cerf, F.**—Nouveau Papilio de Guayne Francaise.—**59,** Lep. i, 49-52. **de Fleury, P.**—Notes sur les premiers etats de quelques L. de la Guinee Francaise.—**59,** Lep., i, 41-8. **Michael, O.**—Studien uber die familie der Agrias.—14, xxxix, 53-5 (cont.). ***Schaus, W.**—New sps. of Epipaschiinae in the Carnegie and National museums.—An. Carnegie Mus., xvi, 9-48.

DIPTERA.—Alverdes, F.—Schutzinstinkt der kocherfliegenlarve.—**107,** xlv, 149-54. **Andrews, H. W.**—Flies and disease.—Proc. So. Lond. Ent. & Nat. Hist. Soc., 1924-25, 45-62. **Kligler & Theodor.**—Effect of salt concentration and reaction on the development of Anopheles larvae.—**22,** xvi, 45-9. **Matheson, R.**—Notes on Chaoborinae (Culicidae).—**4,** lvii, 159-60. **Matthey, R.**—Biologie de Tachina larvarum.—An. Par. Hum. et Comp., Paris, ii (1924), 202-6. **Parent, O.**—Etudes sur les Dolichopodides de la collection Meigen.—**59,** Dip., ii, 41-58. **Thompson, W. R.**—Les larves primaires des tachinaires a oeufs microtypes.—An. Par. Hum. et Comp., Paris, ii (1924), 185-201, 279-306. **Villeneuve, J.**—Oestridomorphisme. p. 1-4. Variations dans la longueur des antennes des Tachinidae. p. 4-5.—**59,** Dip., ii, 1-5.

(N) ***Aldrich, J. M.**—Two n. sps. of the tachinid genus Lixophaga with notes and key.—**10,** xxvii, 132-36. ***Curran, C. H.**—New Tachinidae in the Canadian Nat. Coll. Buckellia, a n. gen. of Asilidae.—**4,** lvii, 150-6. ***Enderlein, G.**—Studien an blutsaugenden insekten. I. Grundlagen eines neuen systems der Tabaniden.—Mitt. Zool. Mus. Berlin, xi, 255-409. ***Felt, E. P.**—New gall midges.— **13,** xvii, 15-20. ***Hull, F. M.**—Notes on the N. Am. sps. of the gen. Didea, with the descr. of a n. sps.—**7,** xviii, 277-81. ***Malloch, J. R.**—Synopsis of new world flies of the genus Sphaerocera (Borboridae).—**10,** xxvii, 117-23. **Neveu-Lemaire, M.**—Evolution de la classification des Culicidae.—Ann. Parasit. Hum. et Comp., Paris, i (1923), 90-107. **Painter, R. H.**—

Review of the genus Lepidophora (Bombyliidae).—**1,** lii, 119-27. ***Spuler, A.**—N. American sps. of the subg. Scotophilella. (Borboridae).—**6,** xxxiii, 70-84.

(S) ***Brethes, J.**—Sur quelques dipteres Chiliens.—**126,** xxviii (1924), 104-11. ***Curran, C. H.**—New D. in the Amer. Mus. Nat. Hist.—**138,** No. 176. ***Krober, O.**—Chrysops-arten Sud-und Mittelamerikas nebst den arten der inselwelt und Mexikos.—**56,** iv, 210-56 (Cont.). ***Malloch, J. R.**—Exotic Muscaridae. Acalyptrata.—**75,** xvi, 81-100. **Porter, C. E.**—Enumeracion de sirfidos colectados en San Jose de Maipo.—**126,** xxviii (1924), 98.

COLEOPTERA.—Balachowsky, A.—Note sur la presence accidentelle de Eburia quadrigeminata (Cerambydidae) de Amer. d. Nord a Alger.—Bul. Soc. Hist. Nat. Af. du N., 1925, 107. **Falcoz, L.**—Etudes sur les Cryptophaginae. Essai sur les larves de Cryptophagus.—Ann. Soc. Linn., Lyon, 1924, 120-7. **Good, H. G.**—Wing venation of the Buprestidae.—**7,** xviii, 251-76. **Kolbe, H.**—Beitrage zur kaefergallenkunde (Agrilus) und zur kenntnis der brutpflege unter den insekten.—**45,** xx, 105-110.

(N) **Banninger, M.**—Neunter beitrag zur kenntnis der Carabinae: die Nebriini.—**49,** xiv, 180-95. ***Blatchley, W. S.**—Notes on the distribution and habits of some Florida C. with descr. of n. sps.—**4,** lvii, 160-8. Notes on the Rhynchophora of eastern No. Am. with descr. of n. sps.—**6,** xxxiii, 87-113. **Brisley, H. R.**—Notes on the Chrysomelidae of Arizona.—**1,** lii, 167-82. **Chittenden, F. H.**—Chalcoides fulvicornis.—**6,** xxxiii, 120. ***Chittenden, F. H.**—Genus Coccotorus.—**10,** xxvii, 129-32. **Mutchler & Weiss.**—Beetles of the genus Conotrachelus known to occur in N. Jersey.—N. J. Dept. Agric. Circ. No. 87. **Pic, M.**—Coleopterorum catalogus. Pars. 81, Rhipiceridae. ***Schaeffer, C.**—Revision of the new world sps. of the tribe Donaciini of the . . . family Chrysomelidae.—Brook. Mus. Sci. Bull., iii, 45-165. **Schenkling, S.**—Coleopterorum catalogus. Pars. 80: Elateridae I.

(S) ***Brethes, J.**—(See under Hymenoptera). ***Fisher, W. S.**—New West Indian Cerambycidae. (Lamiinae).—**138,** No. 174. **Porter, C. E.**—Sobre un coleoptero Chileno poco conocido.—**126,** xxviii (1924), 112-14. ***Ruiz, F.**—Notas biologicas sobre algunos insectos Chilenos. El genero Idiostoma en Chile.—**126,** xxviii (1924), 76-80; 99-101.

***Thery, A.**—Descriptions de genres nouveaux de Buprestides.—**25,** 1925, 122-6.

HYMENOPTERA.—Burrill, A. C.—Honey bees follow wood bees for nectar.—Science, lxii, 134. **Evenius, J.**—Entwicklung des zwischendarms der honigbiene.—**154,** lxiii, 49-64. **Genieys, P.**—Habrobracon brevicornis.—**7,** xviii, 143-202. **Joachim u. Evenius.**—Kryptenzellen und epithelregeneration im mitteldarm der honigbiene.—**154,** lxii, 250-6. **Verlaine, L.**—Instinct et intelligence chez les hymenopteres.—**33,** lxiv, 197-237. Instinct et intelligence chez les hymenopteres.—Acad. R. Belg., Mem. viii, Fasc. 2.

(N) **Bequaert, J.**—Genus Ancistrocerus (Vespidae) in N. Am., with a partial key to the species.—**1,** lii, 57-117. ***Carter, W.**—Records of Alberta Sphecoidea with descr. of n. sps. of Crabronidae.—**4,** lvii, 131-6. **Dohzhansky, T.**—Zur kenntnis der gattung Ciccinella.—**154,** lxii, 241-9. **Schmiedeknecht, O.**—Opuscula ichneumonologica.—Fasc., 39, 40. ***Viereck, H. L.**—New bee of the Gen. Andrena . . . [from Arizona].—**1,** lii, 135-6. Preliminary revision of the Campopleginae in the Canadian Nat. Coll., Ottawa.—**4,** lvii, 176-81.

(S) ***Brethes, J.**—Quelques insectes du Paraguay.—**126,** xxviii (1924), 67-72. ***Frison, T. H.**—Contribution to the classification of the Bremidae of Central and So. America.—**1,** lii, 137-65. ***Viereck, H. L.**—Wasp-like insects or H., exclusive of ants, collected by the Barbados-Antigua Expd. in 1918.—Univ. Iowa Stud., xi, No. 4, p. 7-11. ***Wheeler, W. M.**—Neotropical ants in the Coll. of the R. Mus. of Stockholm.—**137,** xviiA, No. 8.

SPECIAL NOTICES

"Eos (Dawn)", La Rivista Espanola de Entomologia, is a quarterly devoted to all classes of Arthropoda. The first number appeared March, 1925, and includes four papers—one on Hymenoptera, one on Coleoptera, and two on Orthoptera. Annual subscription, foreign is 20 pesetas and is published by the Entomological Section of the Museo Nac. de Cien. Nat. Madrid.

The Kansas Entomological Society was formed recently at a meeting of entomologists at the Kansas Agricultural College. The Society will hold its meetings annually in connection with those of the Kansas Academy of Science. —Science. [See The NEWS for July, 1925, p. 221.]

Doings of Societies.

The American Entomological Society.

The following meetings were held, as usual, at The Academy of Natural Sciences of Philadelphia:

Meeting of Jan. 22, 1925. The meeting was called to order by Dr. Skinner, President. Nine members and visitors present. The reports of officers and committees followed.

The new by-laws were read as revised at the last meeting. Dr. Calvert moved that each article be adopted as read. Motion carried. Except for the following articles the by-laws were adopted as read without discussion. Art. 4, Chapt. 2 was adopted after discussion without change; Art. 6 was added to Chapter I; Chapt. 5, Art. 1. On motion the by-laws were adopted collectively. On motion it was ordered that the by-laws be printed with the act of incorporation under one cover.

Mr. Rehn moved that the publication committee be suggested to consider a special price for publications to members; carried.

Mr. Cresson moved that the motion passed at the special meeting of Jan. 19, 1925, in regard to dates of meetings, viz.: that regular meetings be held the fourth Thursday of the month except when this day is a legal holiday in which case it shall be held on the preceding Thursday, be readopted and the hour be fixed at 7.30 P. M. Adopted.

After some discussion it was decided that under the new by-laws new officers and committees must be elected. The following nominations were made:

Dr. H. Skinner, President; P. Laurent, Vice President; Dr. P. P. Calvert, Corresponding Secretary; R. J. Titherington, Recording Secretary; M. Hebard, Treasurer; E. T. Cresson, Jr., Librarian; R. C. Williams, Curator.

Finance Committee: R. C. Williams, F. R. Mason, J. A. G. Rehn.

Publication Committee: J. A. G. Rehn, P. P. Calvert, M. Hebard.

Library Committee: R. C. Williams, P. Laurent, M. Hebard.

These nominations were all seconded without comment and on motion the secretary cast a ballot, and the nominees were declared elected.

Mr. Rehn moved that the committee on by-laws be discharged with thanks. Adopted.

Dr. Calvert presented on behalf of Dr. F. M. Root the type specimen of *Enallagma dubium* Root, 1924.

Dr. Skinner gave an interesting talk on the relation of names to biological characteristics in variations. Mr. Rehn spoke on the relation of this subject to the Orthoptera, and showed an interesting series of grouse locust variations obtained by breeding. Mr. Rehn also showed plates for a publication on West Indian Blattidae.

Meeting of February 26, 1925.—Called to order by Dr. Skinner. Seven members and visitors present.

Mr. Williams, as former Treasurer, reported having turned over the securities to Mr. Hebard, who stated that the society was in good condition financially.

Mr. H. Hornig and Mr. Kisliuk were elected to membership unanimously.

ODONATA: Dr. Calvert gave an interesting talk on observations made on our latest autumn dragon-fly, *Sympetrum vicinum*. He exhibited specimens and showed some slides to illustrate his communication in which he told of trying to find some relation between lateness of survival, sunshine and temperature.*

COLEOPTERA: Mr. Kisliuk presented some specimens of *Euscepes batatae*, including larvae, pupae and adults. This insect is injurious to sweet potatoes.

Meeting of March 26, 1925.—Called to order by Dr. Skinner. Twelve members and visitors present.

On the matter of collecting trips for 1925, Mr. Cresson, Jr., proposed three trips in the spring, April 18, May 16 and June 13. The first to Dismal Run Woods, Media.

Mr. R. T. Davis was elected a resident member of the Society and Mr. E. T. Cresson, Sr., an honorary member.

Mr. Calvert presented a photograph of the Entomological Society of America taken at their meeting in Washington in December. Mr. Cresson, Jr., spoke about the Thomas L. Casey collection which he had seen while in Washington lately. At a meeting of entomologists held there it was recommended that the collection be kept intact until properly catalogued, after which material might be taken out by responsible persons. Dr. Skinner showed a branch of a species of birch from Kamchatka having on it a scale-like parasite. He also made some interesting observations on some South American lepidoptera.

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*A paper on this subject will be printed in *Ecology*.—EDITOR.

Meeting of April 23, 1925.—Called to order by Dr. Skinner. Fifteen members and visitors present.

Mr. Cresson, Jr., reported the receipt of the following specimens: 301 Anthomyiidae, including 39 specimens new to the collection, from the Boston Society of Natural History, 8 Diptera of genera *Argyra* and *Raphium* from C. H. Curran, 2 specimens *Spilographa electra* from H. Hornig, 10 specimens of *Astalis snowii* from Kansas University.

Mr. Cresson reported for the Committee on collecting trips that on the scheduled trip to Dismal Run Woods, Media, with the Leidy Club, four members of the Society participated.

The following were elected to resident membership in the Society by unanimous vote: Arthur B. Wells, John H. Brownback, E. H. Cienkowski, R. G. Schmieder, F. M. Jones, P. A. Turner, T. E. Winecoff, C. W. Fenninger, and Ernest Baylis.

ORTHOPTERA.—Dr. Calvert presented on behalf of Dr. A. M. Norton, a specimen of a black grasshopper which had been collected Aug. 19, 1924, at Somerset, Pennsylvania. Mr. Rehn answered a number of questions and suggested that it might be a black form of *Melanoplus femoratus*.

LEPIDOPTERA.—Mr. Cresson, Jr., showed a copy of a German Entomological Year Book, also a copy of a de luxe edition with colored plates of Lepidoptera, called Thesis Entomologique. Dr. Skinner brought out two cases of South American Lepidoptera (*Agrias*) with which he illustrated an interesting short talk.

Mr. Hornig showed the specimens which he took on the Media trip.

R. J. TITHERINGTON, *Sec'y*.

OBITUARY.

The English entomological journals for July, 1925, contain obituary notices of ARTHUR GARDINER BUTLER, Assistant in the British Museum of Natural History 1865-1879, Assistant Keeper in charge of Arthropoda 1879-1901. He was born June 27, 1844, and died at Beckenham, Kent, May 28, 1925. While he wrote upon many of the groups of animals under his care, his publications concerned chiefly the Lepidoptera, especially the Pierid and Lycaenid butterflies. He is credited with having described upward of 1000 species of Pieridae, many of which are now regarded as seasonal variations. His writings, more than 500 in number, include generic revisions, faunal papers and one separate work, *Lepidoptera Exotica*, 1869-1874, issued in parts, quarto, by Janson, London.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—Canadian Entomol, Vol. 2 (1869) to 8 (1876); Vol. 17 (1885), Nos. 5, 9; Vol. 18 (1886), No. 3; Amer. Entomologist, Vol. 1 to 3 (1868-1880); Zoe, Vol. 5, No. 12; Proc. Ent. Soc. Washington, Vol 1 (1899) to 5 (1903); all in exchange for **Cetonides** and **Longicorns** from New Guinea or other countries. Also entomol. literature could be given. Address, Deutsches Entomol. Institut, (Walther Horn), Gossler Str. 20, Berlin-Dahlem, Germany.

Wanted—Correspondence with collectors desiring to make a trip to South America to collect with me as a companion. Write—A. F. Porter, Decorah, Iowa.

E. A. Dodge of 546 Bay St., Santa Cruz, California, would be pleased to exchange with other W. S. Lepidopterists.

Wanted—Macrolepidoptera (first quality only, in papers) and living pupae from all countries in exchange for European material. Herbert Noack, Mathildenplatz 8, Darmstadt, Germany.

Will send volumes XXV (1921) and XXVII (1923), Revista Chilena de Historia Natural, in exchange for School Entomology by Sanderson & Peairs and Classbook of Economic Entomology by Wm. Lochhead (latest editions) sent to me by registered mail. Will give vol. XXXV also for a copy of American Insects by V. L. Kellogg (last edition) sent registered. Prof. Dr. C. E. Porter, Casilla 2974, Santiago, Chile.

For Exchange—A fine collection of butterflies of the Indian region, 1300 species, including many rarities. Apply to Dr. C. F. C. Beeson, Forest Research Institute, Dehra Dun, India.

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874.—**Brisley** (H. R.).—Notes on the Chrysomelidae of Arizona. (Trans., **51**, 167-182, 1925)..... .35

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870.—**Painter** (R. H.).—A review of the genus Lepidophora (Bombyliidae). (Trans., **51**, 199-127, ill., 1925)..... .20

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869.—**Bequaert** (J.).—The genus Ancistrocerus (Vespidae) in North America, with a partial key to the species. (Trans., **51**, 57-117, 1925)..... 1.25

871.—**Compere** (H.).—A new genus and species of Aphelinidae from China. (Trans., **51**, 129-134, 2 pls., 1925)..... .20

872.—**Viereck** (H. L.).—A new bee of the genus Andrena [from Nevada]. (Trans., **51**, 135-136, 1925)..... .20

873.—**Frison** (T. H.).—Contribution to the classification of the Bremidae of Central and South America. (Trans., **51**, 137-165, 2 pls., 1925)..... .65

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865.—**Braun** (A. F.).—Some undescribed microlepidoptera and notes on life histories. (Trans., **51**, 13-17, 1925)..... .20

867.—**Coolidge** (K. R.).—The life history of Danaus berniice strigosa (Danaidae). (Trans., **51**, 27-33, 1925)..... .20

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864.—**Hebard** (M.).—The group Taeniopodae as found in the U. S. (Trans., **51**, 1-12, col. pl., 1925)..... .40

866.—**Rehn** (J. A. G.).—Notes on West Indian Dermaptera with the description of a n. sp. of Vostox. (Trans., **51**, 19-26, ill., 1925)..... .20

868.—**Hebard** (M.).—Records of European Acrididae, Tettigoniidae and Gryllidae. (Trans., **51**, 33-55, 1925)..... .45

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